

CLAIMS

What is claimed is:

1. An apparatus, comprising:

- a die carrier;
- a heat spreader lid mounted on the die carrier to form a lid cavity;
- an integrated circuit (IC) die mounted on the die carrier and within the lid cavity;

and

- a cured mold compound disposed to fill the lid cavity and to at least partially surround the IC die.

2. The apparatus according to claim 1, wherein the heat spreader lid has a dispensing hole formed therein to facilitate injection of a mold compound solution into the lid cavity and an air outlet hole formed therein to allow air to escape from the lid cavity.

3. The apparatus according to claim 2, wherein heat spreader lid is made of metal.

4. The apparatus according to claim 3, wherein the heat spreader lid includes a thermal interface material interposed in thermal conducting relationship between the heat spreader lid and the die.

5. The apparatus according to claim 4, wherein the thermal interface material is coaxially aligned with the die and includes a width and a length dimension which are substantially the same as a corresponding width and a corresponding length dimension of the die.

6. The apparatus according to claim 5, wherein the thermal interface material comprises a cold form thermal interface material.

7. The apparatus according to claim 6, wherein the die includes a first surface, a second surface and a plurality of lateral sides extending between the first and second surfaces; the first surface includes a plurality of electrical contacts coupled to the die

carrier; the second surface is disposed in an abutting relationship with the thermal interface material; and the mold compound extends between the heat spreader lid and the die carrier and surrounds the lateral sides and the first surface of the die.

8. The apparatus according to claim 7, wherein the die is mounted to the die carrier by a flip-chip mounting.

9. The apparatus according to claim 8, wherein the flip-chip mounting includes a plurality of solder bumps coupling the die to the die carrier.

10. The apparatus according to claim 10, wherein the mold compound is a polymeric material.

11. A method, comprising

- providing a die carrier with a die mounted thereon and a heat spreader lid with a thermal interface material mounted thereon for use in forming a package;
- forming the package by placing the heat spreader lid on the die carrier to form a lid cavity therebetween;
- dispensing a mold compound into the lid cavity; and
- curing the package.

12. The method according to claim 11, wherein dispensing the mold compound into the lid cavity includes dispensing the mold compound through a dispensing hole formed in the heat spreader lid and allowing air to escape through an air outlet hole in the lid cavity.

13. The method according to claim 12, wherein curing the package includes a one-time curing of both the mold compound and the thermal interface material.

14. The method according to claim 13, further comprising:

- applying a clamping force to the heat spreader lid during the dispensing of the mold compound and the curing of the package.

15. The method according to claim 14, further comprising:

- after the curing process, removing the clamping force and mounting a plurality of electrical contacts to the land side of the die carrier.

16. A system, comprising:

- an integrated circuit (IC) package including a die carrier; a heat spreader lid mounted on the die carrier to form a lid cavity; an IC die mounted on the die carrier and within the lid cavity; and a cured mold compound disposed to fill the lid cavity and to partially surround the IC die; and
- a circuit board having mounted thereon the IC package; a dynamic random access memory coupled to the IC package; and an input/output interface coupled to the IC package.

17. The system according to claim 16, wherein the IC die is a microprocessor and the circuit board is a motherboard.

18. The system according to claim 17, wherein the input/output interface comprises a networking interface.

19. The system according to claim 18, wherein the system is a selected one of a set-top box, an entertainment unit and a DVD player.

20. The system according to claim 16, wherein the heat spreader lid has a dispensing hole formed therein to inject a mold compound solution into the lid cavity and an air outlet hole formed therein to allow air to escape from the lid cavity.

21. The system according to claim 20, wherein heat spreader lid is made of metal.

22. The system according to claim 21, wherein the heat spreader lid includes a thermal interface material interposed in thermal conducting relationship between the heat spreader lid and the die.

23. The system according to claim 22, wherein the thermal interface material is coaxially aligned with the die and includes a width and a length dimension which are substantially the same as a corresponding width and a corresponding length dimension of the die.

24. The system according to claim 23, wherein the thermal interface material comprises a cold form thermal interface material.

25. The system according to claim 24, wherein the die includes a first surface, a second surface and a plurality of lateral sides extending between the first and second surfaces; the first surface includes a plurality of electrical contacts coupled to the die carrier; the second surface is disposed in an abutting relationship with the thermal interface material; and the mold compound extends between the heat spreader lid and the die carrier and surrounds the lateral sides and the first surface of the die.

26. The system according to claim 25, wherein the die is mounted to the die carrier by a flip-chip mounting.

27. The system according to claim 26, wherein the flip-chip mounting includes a plurality of solder bumps coupling the die to the die carrier.

28. The system according to claim 27, wherein the mold compound is a polymeric material.